Section 3.6

# Geology, Seismicity, and Soils

# Section 3.6
# Geology, Seismicity, and Soils

This chapter provides a discussion of the geologic, seismic, and soil conditions that currently exist within the project area. The potential impacts of the proposed project related to existing geologic, seismic, and soil conditions are also evaluated in this chapter, and mitigation is proposed where applicable. A summary of impacts and mitigation measures is presented in Table 3.6-1.

The description of existing conditions and subsequent impact analysis presented in this chapter are based on a review of maps and information published by the USGS, the California Geological Survey (CGS) (formerly the California Division of Mines and Geology), the County of Monterey, and the Natural Resources Conservation Service (NRCS). Unless otherwise noted by citation, the existing conditions and impact analysis in this chapter also rely on relevant site-specific geologic and geotechnical reports prepared for the PBC Del Monte Forest Preservation and Development Plan EIR (Monterey County 2005).

**Table 3.6-1. Summary of Project Impacts on Geology, Seismicity, and Soils**

| Impact Topic | Project Elements | | | | | | | | | Cumulative |
|---|---|---|---|---|---|---|---|---|---|---|
| | PBL | SBI | COL-EQC | Area M MH | Area M MR | RES SUB | RD | TRA | INF | |
| **A. Seismic Hazards** | | | | | | | | | | |
| GSS-A1. Placement of new structures could result in potential structural damage and associated human safety hazards resulting from ground shaking caused by earthquakes on nearby active and potentially active faults. | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | — | — | ⊙ |
| Mitigation Measures: | GSS-A1. Ensure final design and construction specifications include recommendations contained in the site-specific geologic and geotechnical reports. | | | | | | | | | |
| **B. Landslides and Slope Stability** | | | | | | | | | | |
| GSS-B1. Placement of buildings and grading on steep and/or unstable slopes could result in potential structural damage and associated human safety hazards from mass movements (landslides and debris flow). | — | — | — | ⊙ | ⊙ | ⊙ | — | — | — | ⊙ |
| Mitigation Measures: | GSS-A1. Ensure final design and construction specifications include recommendations contained in the site-specific geologic and geotechnical reports. | | | | | | | | | |
| **C. Erosion** | | | | | | | | | | |
| GSS-C1. Grading and excavation could result in substantial soil erosion, loss of topsoil, and sedimentation. | ⊙ (Applies to proposed project as a whole) | | | | | | | | | ⊙ |
| Mitigation Measures: | GSS-C1. Prepare and implement an erosion and sediment control plan. | | | | | | | | | |
| **D. Soils Constraints** | | | | | | | | | | |
| GSS-D1. Construction in areas of expansive soils could result in substantial damage to overlying building foundations and roadways. | — | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | — | — | ⊙ |
| GSS-D2. Construction of underground structures in the presence of shallow groundwater and weak surrounding deposits could result in inadequate drainage and structural failure during construction or operation. | ⊙ | — | — | ⊙ | ⊙ | ⊙ | — | — | — | ⊙ |
| GSS-D3. Construction in areas of unconsolidated fill could result in settlement and substantial damage to overlying building foundations. | — | ⊙ | — | ⊙ | ⊙ | ⊙ | — | — | — | ⊙ |

| Impact Topic | Project Elements | | | | | | | | | Cumulative |
|---|---|---|---|---|---|---|---|---|---|---|
| | PBL | SBI | COL-EQC | Area M MH | Area M MR | RES SUB | RD | TRA | INF | |
| Mitigation Measures: | GSS-A1. Ensure final design and construction specifications include recommendations contained in site-specific geologic and geotechnical reports.<br>GSS-D1. De-water excavations and shore temporary cuts during construction of the underground facilities.<br>HYD-A1. Ensure on-site detention of stormwater run-off at development sites and oil/grease separators at parking lots; prepare final drainage plan with flow calculations and construction detail; and implement approved drainage plan.<br>HYD-A2. Maintain and monitor drainage and flood control facilities, and prepare annual reports that describe the condition, maintenance performed, and required improvements of drainage and flood control facilities. | | | | | | | | | |
| **E. Hazardous Materials** | | | | | | | | | | |
| Impact GSS-E1. Potential hazardous materials and methane off-gassing related to materials in the fill at the Corporation Yard could result in worker and/or resident exposure to hazardous materials or hazardous conditions. | — | — | — | — | — | ◉ | — | — | — | ◉ |
| Mitigation Measures: | GSS-E1. Conduct Phase II investigation consisting of subsurface soil borings and initiate remedial action if warranted at Corporation Yard.<br>GSS-E2. Assess potential for methane off-gassing at the Corporation Yard fill area and incorporate methane controls and/or venting into construction plans and final design if warranted. | | | | | | | | | |

Notes:

● = Significant unavoidable impact.

◉ = Significant impact that can be reduced to less than significant.

○ = Less-than-significant impact.

— = No impact or not applicable to the development site.

**PBL** – The Lodge at Pebble Beach; **SBI** – The Inn at Spanish Bay; **COL-EQC** – Collins Field–Equestrian Center–Special Events Area; **MH** – Area M Spyglass Hill—New Resort Hotel (Option 1); **MR** – Area M Spyglass Hill—New Residential Lots (Option 2); **RES SUB** – Residential Lot Subdivisions; **RD** – Roadway Improvements; **TRA** – Trail Improvements; **INF** – Infrastructure Improvements; **CUMULATIVE** – Proposed Project's Contribution to Cumulative Impacts

# Regulatory Setting

Relevant regulations that apply to geology and soils are discussed below.

## Section 402 of the Federal Clean Water Act

Section 402 of the Federal Clean Water Act mandates that certain types of construction activity comply with the requirements of the Environmental Protection Agency's NPDES stormwater program. Phase II of the NPDES stormwater program regulations are currently in effect and require that construction activities disturbing 1 or more total acres obtain coverage under the NPDES general construction activity stormwater permit issued by the California State Water Resources Control Board (WRCB).

Because the proposed project would result in the disturbance of an area greater than 1 acre, the project proponent would need to obtain coverage under the NPDES general construction activity stormwater permit. The Central Coast Regional Water Quality Control Board (CCRWQCB) administers the NPDES stormwater permit program for Monterey County. Obtaining coverage under the NPDES general construction activity permit generally requires that the project applicant (1) file a notice of intent with the SWRCB describing the proposed construction activity before construction begins, (2) prepare a SWPPP that describes the BMPs that will be implemented to control accelerated erosion, sedimentation, and other pollutants during and after project construction, and (3) file a notice of termination with the SWRCB when construction is complete and the construction area has been permanently stabilized.

## Alquist-Priolo Earthquake Fault Zoning Act

The major state legislation regarding earthquake fault zones is the Alquist-Priolo Earthquake Faults Zoning Act of 1994 (formerly known as the Alquist-Priolo Special Studies Zones Act of 1972). The purpose of the act is to regulate development near active faults and thereby reduce the hazards of surface fault rupture. There are no zoned faults within the project area (County of Monterey 1995).

## California Uniform Building Code

The major state regulations regarding geo-seismic hazards, other than surface faulting, are contained in Title 24, Part 2, California Uniform Building Code (CUBC). The CUBC applies to public building and a large percentage of private building in the State. It is based on the current federal Uniform Building Code, but contains additional amendments, and repeals that are specific to building conditions and structural requirements in the state of California. Local codes are permitted to be more restrictive than Title 24 but are required to be no less restrictive. Chapter 23 of the CUBC deals with general design requirements, including (but not limited to) regulations governing seismically resistant construction. Chapters 29 and 70 deal with excavations, foundations, retaining walls, and grading including (but not limited to) requirements for seismically resistant design, foundation investigations, stable cut and fill slopes, and drainage and erosion control. The project area is within CUBC Seismic Zone 4 and therefore is required to meet the most stringent CUBC construction standards (County of Monterey 1995).

# Seismic Hazards Mapping Act

The Seismic Hazard Mapping Act was enacted by the California legislature in 1990 following the Loma Prieta earthquake of 1989. The act requires that, for projects within seismic hazard zones, a certified engineering geologist prepare a site-specific geotechnical report that identifies the nature and severity of the seismic hazards and identifies appropriate mitigation. Several site-specific geotechnical reports were prepared for the proposed project (Haro, Kasunich and Associates, Inc. 2001a, 2001b, 2001c, 2001d, 2001e, 2002a, 2002b, 2010a, 2010b, 2010e, 2010f, 2010g, 2010i, 2010j, 2010k, 2010l; Nielsen and Associates 2002a, 2002b, 2002c, 2002d, 2002e, 2002f, 2002g, 2002h, 2002i; Parikh Consultants 2001; Terratech Inc. 1991).

# Monterey County Local Coastal Program

The existing and proposed Del Monte Forest LUP and CIP contain specific policies regarding geologic hazards, soil resources, and grading (erosion control). One policy of particular relevance to this analysis is the existing LUP Policy 3 (proposed LUP Amendment Policy 78) which states that development on slopes exceeding 30% is prohibited unless the proposed development better achieves other resource protection objectives and policies in the LUP than alternative without building on the 30% or over slopes. The existing LUP also includes certain requirements concerning grading and management of erosion potential (Policy 3, 4 and others). The proposed LUP Amendment retains much of the existing LUP requirements on grading and erosion, but also includes technical edits to make the LUP a policy document versus a technical document. Technical detail is proposed to be moved to the CIP and/or removed, provided there are equivalent requirements in the County's grading code, which applies to all new grading in Del Monte Forest.

# Monterey County Erosion Control Ordinance

Monterey County has a specific Erosion Control Ordinance (Chapters 16.08 through 16.12 of the County Code). The Building Services Department enforces the ordinance. The ordinance was adopted to safeguard the health, safety and public welfare and to minimize erosion, protect fish and wildlife, and otherwise protect the natural environment. Erosion control plans are required for building, grading, and land clearing.

Grading permits are required for all projects that move 100 cubic yards or more of soil. No grading permit can be issued if a determination is made that grading will result in hazards by reason of flood, geological hazard, seismic hazard or unstable soils, or is liable to endanger any other property or result in the deposition of debris on any public way or property or drainage course, or otherwise create a nuisance. Grading/erosion control inspectors and the chief building official conduct the procedural review associated with issuance of grading permits.

Erosion control measures are enforced to eliminate and prevent conditions of accelerated erosion that have lead to, or could lead to degradation of water quality, loss of fish habitat, damage to property, loss of topsoil or vegetation cover, disruption of water supply, and increased danger from flooding.

# Environmental Setting

## Geology

The project area is located in the Coast Ranges geomorphic province of California, near the northern terminus of the Santa Lucia Range. The most recent geologic map of the project area indicates that there are nine surficial geologic units located within the project area and vicinity (Allen 2011). The general characteristics of these units, and the development sites affected by each, are described in Table 3.6-2 and shown in Figure 3.5-2 in Section 3.5, Cultural Resources.

**Table 3.6-2. Geologic Units Within Project Development Sites**

| Geologic Unit | Geologic Period | Description | Development Sites |
|---|---|---|---|
| Artificial fill | Holocene | Artificial fill in the project area consists of a heterogeneous mixture of artificially deposited material ranging from well-compacted sand and silt to poorly compacted sediment high in organic matter content. | MH/MR |
| Dune sand deposits | Holocene | Dune sand deposits in the project area consist of unconsolidated, well-sorted, medium- to coarse-grained sand as much as 80 feet thick. | SBI (Conference Center Expansion) |
| Undivided alluvial deposits | Holocene | The undivided alluvial deposits that occur within the project area consist of unconsolidated, heterogeneous, moderately sorted silt and sand with discontinuous lenses of clay and silty clay. The thickness of these deposits is highly variable but can be as much as 100 feet. | SBI (New Employee Parking)<br>MR<br>RES SUB (Area L and Corporation Yard) |
| Young dune deposits | Pleistocene | The young dune deposits that occur within the project area consist of weakly-consolidated, well-sorted, fine- to medium-grained sand. The thickness of these dune deposits ranges from 6.5 to 80 feet. | SBI (New Guest Cottages) |
| Older dune deposits | Pleistocene | The older dune deposits that occur within the project area consist of weakly- to moderately-consolidated, moderately well-sorted silt and sand. The thickness of these dune deposits ranges from 6.5 to 80 feet. | SBI (New Employee Parking)<br>RES SUB (Areas L and U)<br>MR |
| Coastal terrace deposits | Pleistocene | The coastal terrace deposits that occur within the project area consist of semi-consolidated, moderately well-sorted marine sand containing thin, discontinuous gravel-rich layers. The terrace deposits are locally overlain by poorly-sorted fluvial and colluvial silt, sand, and gravel. The thickness of coastal terrace deposits in the project area is variable, but is generally less than 20 feet. | COL-EQC (All three development sites)<br>PBL (All three development sites)<br>MH/MR<br>RES SUB (Areas J, l, M, V, U, I-2, F-2 and Corporation Yard) |

| Geologic Unit | Geologic Period | Description | Development Sites |
|---|---|---|---|
| Lower unit of the Monterey Formation | Miocene | The lower unit of the Monterey Formation consists of thin-bedded, yellowish-brown, semi-siliceous mudstone that is as much as 100 feet thick. | RD (SR 1/SR 68/17-Mile Drive) |
| Los Laureles/ Vaqueros/Temblor | Miocene | The sandstone units in the project area typically consist of dark-yellowish-orange, very thick bedded, coarse- to fine-grained, angular to subangular, poorly to well-sorted arkosic sandstone, with common very thick cobble-boulder conglomerate beds in the lower part and rare siltstone beds in the upper part (Clark et al. 1997). | RES SUB (Area I-2) |
| Porphyritic granodiorite of Monterey of Ross (1976) | Cretaceous | The porphyritic granodiorite of Monterey of Ross (1976) is light gray to moderate pink and medium grained. | RES SUB (Areas I-2 and Corporation Yard) |

Notes:
**PBL** – The Lodge at Pebble Beach; **SBI** – The Inn at Spanish Bay; **COL-EQC** – Collins Field–Equestrian Center–Special Events Area; **MH** – Area M Spyglass Hill—New Resort Hotel (Option 1); **MR** – Area M Spyglass Hill—New Residential Lots (Option 2); **RES SUB** – Residential Lot Subdivisions; **RD** – Roadway Improvements

# Seismicity

## Area Faults

The California State Geology and Mining Board (the Board) has established policies and criteria for the classification of known faults in California based on the presence or absence of a detectable fault trace and the recency of fault displacement (Hart and Bryant 1997). Detectable fault traces that show evidence of displacement during the last 10,000 to 11,000 years (i.e., Holocene faults) are defined as *active* and are considered to have the greatest potential for surface rupture. Detectable fault traces that show evidence of displacement between 11,000 and 1.6 million years ago (i.e., Quaternary faults) are defined as *potentially active,* and are considered to have less potential for surface rupture. The Board has not established an official category for faults that show no evidence of displacement greater than 1.6 million years (i.e., pre-Quaternary faults). Although such faults are not deemed inactive, they are considered to have a relatively low potential for surface rupture.

Del Monte Forest is located within a highly seismically active region of California. The fault activity map of California (Jennings 1994) and recent geologic investigations conducted by Nielsen and Associates (2002a–i) indicate that the project area is located in the vicinity of several active and potentially active faults/fault zones. The names of these faults/fault zones, the recency of their activity, and their approximate distance from the project area are listed below.

### Active Faults

- San Andreas Fault: located approximately 28 miles from Del Monte Forest.
- Sargeant Fault: located approximately 31 miles from Del Monte Forest.

- Palo Colorado-San Gregorio Fault: located approximately 4 miles from Del Monte Forest.
- Calaveras/Paicines/Hayward Fault: located approximately 35 miles from Del Monte Forest.
- Monterey Bay Fault: located approximately 4 miles from Del Monte Forest.
- Sylvan Thrust Fault: located approximately 0.5 mile from Del Monte Forest.
- Hatton Canyon Fault: located approximately 1,000 feet from Del Monte Forest.

### Potentially Active Faults

- Reliz (King City) Fault: located approximately 10 miles from Del Monte Forest.
- Cypress Point Fault: located beneath the extreme southwestern part of Del Monte Forest.
- Zayante-Vergeles Fault: located approximately 25 miles from Del Monte Forest.
- Navy Fault: located approximately 3 miles from Del Monte Forest.
- Seaside Fault: located approximately 4 miles from Del Monte Forest.
- Ord Terrace Fault: located approximately 5 miles from Del Monte Forest.
- Chupines Fault: located approximately 5 miles from Del Monte Forest.
- Tularcitos Fault: located approximately 8 miles from Del Monte Forest.
- Sur-Nacimiento Fault: located approximately 5 miles from Del Monte Forest.

The Cypress Point fault trends northwest across the tip of the Monterey Peninsula from Pescadero Point to Fan Shell Beach and is concealed beneath Quaternary sediments. Terrace deposits do not appear to be displaced by the Cypress Point faults, suggesting that fault movement occurred before the period (County of Monterey 1995).

## Seismic Hazards

Seismic hazards present in Monterey County include ground rupture along faults, ground shaking, and liquefaction (Nielsen and Associates 2002a–i). Each of these hazards and their potential to affect the proposed development sites are discussed below. Slope stability and landslides are discussed separately below.

### Surface Fault Rupture

Surface fault rupture is a seismic hazard that can damage structures constructed above active faults. Surface fault rupture can occur rapidly during an earthquake or slowly over many years via a process known as fault creep. None of the proposed development sites are located above or in the immediate vicinity of the active or potentially active faults identified by Jennings (1994) and Nielsen and Associates (2002). The Cypress Point fault is the closest of the active or potentially active faults in the vicinity of the proposed project. This fault is a northwest-trending oblique-slip fault located approximately 2,000 to 2,500 feet southwest of the proposed facilities at The Lodge at Pebble Beach. According to the geologic investigations conducted by Nielsen and Associates (2002a–i) the Cypress Point fault is probably capable of generating earthquakes in the 4–5 magnitude range. Accordingly, the surface fault rupture hazard at the proposed development sites is very low.

### Seismic Ground Shaking

Seismic ground shaking can cause varying degrees of damage to buildings, ranging from cosmetic to severe structural damage. In 1996, California Division of Mines and Geology (CDMG) released a probabilistic seismic hazard assessment for the state of California to aid in the assessment of seismic ground shaking hazards in California (Peterson et al. 1996). The report contains a probabilistic seismic hazard map that depicts the peak horizontal ground acceleration values exceeded in a given region of California at a 10% probability in 50 years (i.e., a 0.2% probability in any one year).

The peak horizontal ground acceleration values depicted on the map represent probabilistic estimates of the ground-shaking intensity likely to occur in different regions of California as a result of characteristic earthquake events on active and potentially active faults in California, and can be used to assess the relative seismic ground-shaking hazard for a given region. The probabilistic peak horizontal ground acceleration values for the project area (i.e., the Monterey Peninsula) range from strong (0.3g) to severe (0.6g) (where *g* is equal to the acceleration due to gravity), suggesting that the development sites will likely experience strong to severe ground shaking from an earthquake in the next 50 years. The ground acceleration values and general ground-shaking hazard reported by Peterson et al. (1996) are consistent with those reported by Monterey County (2002), Haro, Kasunich and Associates, Inc. (2001a, 2001b, 2001c, 2001d, 2001e), 2002a, 2002b, 2010a, 2010b, 2010c, 2010d, 2010e, 2010f, 2010g, 2010h, 2010i, 2010j, 2010k, 2010l, 2010m), Nielsen and Associates (2002a, 2002b, 2002c, 2002d, 2002e, 2002f, 2002g, 2002h, 2002i), and Parikh Consultants (2001).

All development sites could be potentially affected by seismic ground shaking.

### Liquefaction and Related Ground Failures

Liquefaction is a process by which soils and sediments lose shear strength and fail during episodes of intense ground shaking. Liquefaction and related ground failures, such as lateral spreading, could damage pipelines and/or result in the loss of foundation-bearing capacity for buildings, which can cause structures to settle, tip, or rise through liquefied soils and sediments.

The susceptibility of a given soil or sediment to liquefaction is primarily a function of local groundwater conditions and inherent soil/sediment properties such as texture and bulk density. Poorly consolidated, well graded, and water-saturated fine sands and silts located within 50 feet of the surface are typically considered to be the most susceptible to liquefaction. The liquefaction potential map of Monterey County (Monterey County 2002) indicates that a high potential for liquefaction exists only in areas underlain by dune sand deposits and undivided alluvial deposits (described above). These areas include the development sites at The Inn at Spanish Bay and residential lot subdivisions in Areas L, M, U, and the Corporation Yard (Allen 2011).

## Slope Stability and Landslides

The stability of existing (natural and manufactured) slopes in the proposed development sites has been evaluated by several geologic and geotechnical engineering firms. No slope stability hazards were identified at development sites at The Inn at Spanish Bay, The Lodge at Pebble Beach, Residential Lot Subdivision areas (all areas except Areas K and Corporation Yard), or the SR 1/SR 68 interchange (Haro, Kasunich and Associates, Inc. 2001a, 2001b, 2001c, 2001e, 2002a, 2002b, 2010a, 2010b, 2010e, 2010f, 2010g, 2010i, 2010j, 2010k, 2010l; Nielsen and Associates 2002a, 2002b, 2002c, 2002d, 2002e, 2002f, 2002g, 2002h, 2002i; Parikh Consultants 2001; Terratech Inc. 1991).

However, the potential for landsliding/slope instability to occur was identified at Area M Spyglass Hill (both options)) due to the steep slope gradients that occur in these areas (Foxx, Nielsen & Associates 1990a,b; M. Jacobs & Associates 1990, 1991a, 1991b; Terratech Inc. 1991; Haro, Kasunich and Associates, Inc. 2001d, 2001f, 2010c, 2010d, 2010h, 2010m). Slope instability at the Corporation Yard (Lots 1–7) is due to landfill material, not steep slopes. In Area K, there are steep cutbanks, an erosional feature caused by surface drainage (Lots 1, 12 and 13).

Topography in the proposed development sites is predominantly level to strongly sloping (0 to 16% slopes). However, some of the proposed development sites include steep slopes, where gradients exceed 30%, including the SR 1/SR 68 interchange (Pebble Beach Company 2002, Parikh Consultants 2001).

# Soils

Soils on the Monterey Peninsula were mapped by the U.S. Department of Agriculture Soil Conservation Service during their survey of Monterey County (Cook 1978). There are approximately nine soil map units located in the proposed development sites. Soil map unit characteristics and descriptions regarding which sites contain different soil units are summarized in Table 3.6-3. Some of the typical characteristics, hazards, and constraints associated with the dominant soil series that comprise the majority of these map units are summarized in Table 3.6-4.

**Table 3.6-3. Soil Unit Descriptions for Soils found within Project Development Sites**

| Soil Unit | Description | Development Sites |
|---|---|---|
| Baywood Sand 2% to 15% Slopes | This map unit is dominated by soils of the Baywood series, which typically consists of very deep, somewhat excessively drained, coarse-textured soils formed from wind-blown (eolian) sand deposits on dunes. | SBI (All three development sites) |
| Dune Land | This map unit consists of gently sloping to steep areas of loose, excessively drained, wind-deposited sand on hummocks, mounds, and hills. | SBI (Conference Center Expansion, New Guest Cottages) |
| Narlon Loamy Fine Sand 2% to 9% Slopes | This map unit is dominated by soils of the Narlon series, which typically consists of deep, somewhat poorly drained, coarse- and fine-textured soils formed from soft marine sediments on uplands. | COL-EQC (All three development sites)<br>PBL (All three development sites)<br>RES SUB (U, V, K, I-2, F-2)<br>RD (SR 1/SR 68/17-Mile Drive Intersection Reconfiguration) |
| Narlon Loamy Fine Sand 15% to 30% Slopes | This map unit is dominated by soils of the Narlon series, which typically consist of deep, somewhat poorly drained, coarse- and fine-textured soils formed from soft marine sediments on uplands. | RES SUB (I-2, F-2, J) |
| Pits and Dumps | This map unit consists of areas from which native soil and underlying material have been removed and areas of uneven accumulation of waste material. These areas include rock quarries, sand and gravel pits, and excavations for refuse disposal. | COL-EQC (Equestrian Center Reconstruction)<br>RES SUB (Corporation Yard) |

| Soil Unit | Description | Development Sites |
|---|---|---|
| Santa Lucia Shaly Clay Loam 15% to 30% Slopes | This map unit is dominated by soils of the Santa Lucia series, which typically consist of shallow to moderately deep, well drained, moderately fine-textured soils formed from weathered shale. | RD (SR 1/SR 68/17-Mile Drive Intersection Reconfiguration) |
| Santa Lucia Shaly Clay Loam 30% to 50% Slopes | This map unit is dominated by soils of the Santa Lucia series, which typically consist of shallow to moderately deep, well drained, moderately fine-textured soils formed from weathered shale. | RD (SR 1/SR 68/17-Mile Drive Intersection) Reconfiguration |
| Sheridan Coarse Sandy Loam 15% to 30% Slopes | This map unit is dominated by soils of the Sheridan series, which typically consist of moderately deep to deep, well drained, moderately coarse-textured soils that formed from weathered granitic and schistose bedrock on hills and mountains. | RES SUB (Corporation Yard) |
| Tangair Fine Sand 2% to 9% Slopes | This map unit is dominated by soils of the Tangair series, which typically consist of very deep, somewhat poorly drained, coarse-textured soils formed from sand deposits on wind-modified terraces. | SBI (All three development sites) |

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**Table 3.6-4. Characteristics of Soil Map Units Located in the Project Area and Development Sites**

| Soil Map Unit[a] | | Parent Material | Texture | Depth to Bedrock (inches) | Shrink-Swell Potential | Runoff Rate | Water Erosion Hazard | Wind Erosion Hazard[b] | Development Sites with Soil Unit |
|---|---|---|---|---|---|---|---|---|---|
| BbC | Baywood Sand, 2% to 15% slopes | eolian sand deposits | sand | >60 | low | slow-medium | slight-moderate | high | SBI (All three development sites) |
| Df | Dune Land | eolian sand deposits | sand | >60 | low | v. slow-slow | high-v. high | high | SBI (Conference Center Expansion, New Guest Cottages) |
| NcC | Narlon Loamy Fine Sand, 2% to 9% slopes | soft marine sediments | loamy fine sand, clay | 53 | low-high | slow-medium | Moderate | high | COL-EQC (All three development sites)<br>PBL (All three development sites)<br>RES SUB (U, V, K, I-2, F-2)<br>RD (SR 1/SR 68/17-Mile Drive Intersection Reconfiguration) |
| NcE | Narlon Loamy Fine Sand, 15% to 30% slopes | soft marine sediments | loamy fine sand, clay | 53 | low-high | medium | Moderate | high | RES SUB (I-2, F-2, J) |
| Pm | Pits and Dumps | N/A | variable | variable | variable | variable | High | variable | COL-EQC (Equestrian Center Reconstruction)<br>RES SUB (Corporation Yard) |
| SfE | Santa Lucia Shaly Clay, 15% to 30% slopes | weathered shale | shaly clay loam | 24 | low | medium | Moderate | low | RD (SR 1/SR 68/17-Mile Drive Intersection Reconfiguration) |
| SfF | Santa Lucia Shaly Clay 30% to 50% slopes | weathered shale | shaly clay loam | <20 | low | rapid | High | low | RD (SR 1/SR 68/17-Mile Drive Intersection) Reconfiguration |
| SoE | Sheridan Coarse Sandy Loam, 15% to 30% slopes | weathered schistose and granitic bedrock | coarse sandy loam | 39 | low | rapid | Moderate | high | RES SUB (Corporation Yard) |

| Soil Map Unit[a] | | Parent Material | Texture | Depth to Bedrock (inches) | Shrink-Swell Potential | Runoff Rate | Water Erosion Hazard | Wind Erosion Hazard[b] | Development Sites with Soil Unit |
|---|---|---|---|---|---|---|---|---|---|
| TaC | Tangair Fine Sand, 2% to 9% slopes | sand | fine sand, sandy loam | >60 | low | Slow | Slight | high | SBI (All three development sites) |

Notes:

[a] Properties listed are for the dominant soil map unit component(s) only.

[b] Wind erosion hazard estimated from Wind Erodibility Group (WEG) ratings (U.S. Department of Agriculture Natural Resources Conservation Service 2001) as determined by ICF as follows: WEGs 1 through 3 = high; WEGs 4 through 6 = moderate; WEGs 7 and 8 = low.

N/A = Not Applicable

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Source: (Cook 1978)

# Geotechnical Constraints and Concerns

Geotechnical constraints and concerns identified in the geotechnical reports prepared for the proposed project are summarized in Table 3.6-5 and Table 3.6-6.

**Table 3.6-5. Summary of Geologic, Seismic, and Soil Constraints at Proposed Development Sites**

| | Development Sites | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Constraint** | **PBL** | **SBI** | **COL-EQC** | **MH** | **MR** | **RES-SUB** | **RD** | **HWY** |
| Strong Seismic Ground Shaking | X | X | X | X | X | X | X | X |
| Moderate to High Water Erosion Hazard | | X | X | X | X | X | X | X |
| High Wind Erosion Hazard | | X | X | X | X | X | X | X |
| Expansive Soils | | X | X | X | X | X | X | X |
| Unconsolidated Fill | | X | | X | X | X | | |
| Existing Steep Slopes (>30%) | | | | X | X | X | | X |
| Slope Stability Hazards | | | | X | X | X | | |
| No major constraints with implementation of standard engineering methods; recommendations of Geotechnical Engineer of Record; and CIP, zoning, and UBC standards. | X | X | X | X | X | X | X | X |

Source:
Summarized from Table 3.6-6.

**Table 3.6-6. Summary of Hazards and Concerns mentioned in Geotechnical and Geologic Reports**

| **Project Development Area** | **Hazards and Concerns Mentioned** |
|---|---|
| PBL | No adverse geotechnical or geologic hazards that would preclude the proposed development in The Lodge at Pebble Beach area.<br>Area Concerns: strong seismic shaking, firm and uniform bearing support for foundations, and provision for adequate surface and subsurface site drainage during and after construction.<br>Specific Development Site Concerns:<br>Meeting Facility Expansion: potential for significant perched groundwater and expansive soils.<br>Parking and Circulation Reconstruction (underground parking structure): loose subsaturated and subsurface zones and stability of temporary cut slopes, potential for significant groundwater.<br>Fairway One Reconstruction: potential for local weak subsurface zones and stability of temporary cut slopes, potential for significant groundwater. |
| SBI | No adverse geotechnical or geologic hazards that would preclude the proposed development in The Inn at Spanish Bay area.<br>Area Concerns: strong seismic shaking, perched surface/groundwater, compressible and highly erodible residuals soils in upper 1-2 feet, firm and uniform bearing support for foundations. |

| Project Development Area | Hazards and Concerns Mentioned |
|---|---|
| COL-EQC | No adverse geotechnical or geologic hazards that would preclude proposed development in the Collins Field-Equestrian Center-Special Events Area.<br>Area Concerns: inadequate surface site drainage, erosion potential, the potential for strong seismic shaking, potential presence of shallow or perched groundwater and expansive soils. |
| MH/MR | No adverse geotechnical or geologic hazards that would preclude the proposed development in the Area M Spyglass Hill area for either the New Resort Hotel option or the New Residential Lots option.<br>Area Concerns: strong seismic shaking, extensive grading to ensure proper placement of engineered fills beneath the proposed building sites, adequate removal of unsuitable fill materials, slope instability and erosion of over steepened fill slopes, perched groundwater, expansive clays, and uniform bearing support for foundations. |
| RES SUB | No identified geotechnical or geologic hazards or constraints that would preclude the development overall of the proposed residential subdivisions.<br>Area Concerns: strong seismic shaking, stability of temporary cut slopes; expansive/weak soils, erosion potential, high potential for perched surface or groundwater, and uniform bearing support for foundations.<br>Specific Development Site Concerns:<br>Corporation Yard: slope instability within the old landfill embankment and settlement of the existing landfill materials. Settlement of the existing landfill materials, extensive grading to ensure adequate removal of unsuitable fill materials and proper placement of engineered fills beneath proposed building sites, uniform bearing support for the proposed structures and adequate surface and subsurface site drainage during and after construction.<br>Area L: Compressible and highly erodible soils in upper 1-2 feet.<br>Area J: Instability of steep cutbanks along creek, and compressible and highly erodible soils in upper 2 feet.<br>Area F-2: Compressible, highly erodible soils in upper 2 feet.<br>Area U: Highly erodible soils near drainage channel (Lots 3 and 4).<br>Area K: Instability of steep cutbanks, compressible and highly erodible soils in upper 2 feet, and flooding from adjacent drainage channels.<br>Area I-2: Erosion of surface soils from uncontrolled surface runoff and compressible and highly erodible soils in upper 2 feet.<br>Area V: Flooding on portions of Lots 1–5. |
| RD | No adverse geotechnical hazards identified that would preclude construction of the proposed SR 1/SR 68/17-Mile Drive intersection reconfiguration or other internal intersection improvements |

Source:

Foxx, Nielsen and Associates 1990a, 1990b; Haro, Kasunich and Associates, Inc. 2001a, 2001b, 2001c, 2001d, 2001e, 2001f, 2001g, 2002a, 2002b; M. Jacobs & Associates 1990, 1991a, 1991b; Mark Thomas & Co. Inc. 2001; Nielsen and Associates 2002a, 2002b, 2002c, 2002d, 2002e, 2002f, 2002g, 2002h, 2002i; Terratech Inc. 1991; Parikh Consultants, 2001(for SR 1/SR 68); County of Monterey 1995 (for residential areas).

Notes:

**PBL** – The Lodge at Pebble Beach; **SBI** – The Inn at Spanish Bay; **COL-EQC** – Collins Field–Equestrian Center–Special Events Area; **MH** – Area M Spyglass Hill—New Resort Hotel (Option 1); **MR** – Area M Spyglass Hill—New Residential Lots (Option 2); **RES SUB** – Residential Lot Subdivisions; **RD** – Roadway Improvements

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# Hazardous Materials

None of the proposed uses or locations will result in creation of risks associated with hazardous material use, creation of a health hazard, or interference with an emergency response plan (Monterey County 2002b). Thus, operational and upset impacts related to hazardous materials are not analyzed further in this Draft EIR.

The Corporation Yard has had past and current use of fuel underground storage tanks, and it is the site of a former landfill. To assess potential hazardous materials related to the existing and prior use of the site, D & M Consulting Engineers (DMCE) completed a Phase 1 Environmental Site Assessment for various Pebble Beach Company-owned properties including the Corporation Yard in July 1999 (Monterey County 2005). DMCE conducted an additional site reconnaissance and environmental document review for the Corporation Yard in 2002 (Monterey County 2005).

Conclusions regarding the Corporation Yard in the Phase 1 report are as follows:

**Underground Storage Tanks.** Double-walled gasoline, diesel, and waste oil underground storage tanks (USTs) have been operated at the Corporation Yard since 1986. The MCHD issued a 1998 upgrade compliance certificate for the UST systems, and leaks have not been detected. Overfill protection or sump sensors were not installed until 1997. The annular space sensors for all three USTs failed function tests in October 1997; the monitoring system was later upgraded. Two sumps are located in the Corporation Yard, one in the fueling area. Two hydraulic hoists are operated at the yard, with underground piping leading to aboveground hydraulic oil tanks. DMCE did identify the tanks as a recognized environmental condition, but did not identify any indications of leaks from any of these systems and did not recommend further analytic testing. DMCE did note that the operation of such systems should be monitored closely (Monterey County 2005).

**Landfill.** DMCE identified that a portion of the Del Monte quarry was used as an unsupervised dumping ground for many years. During a prior subsurface geotechnical investigation, debris encountered in the fill material included wood chunks, decayed wood fragments, metal, plastic, concrete, asphalt and masonry (all inert debris). Based on the prior subsurface investigation, a fill area was identified on the site, measuring up to 60 feet thick. The fill material has a strong odor of fuel, but this was attributed to decaying organic matter. DMCE identified that methane off-gassing might also be occurring in this area. DMCE did not identify any evidence that hazardous materials were dumped in this area. DMCE identifies that there is an absence of beneficial uses of ground water in this bedrock bowl. DMCE did not identify the landfill as a recognized environmental condition and did not recommend further analytical testing (Monterey County 2005).

The 2002 site reconnaissance and records review did not identify any evidence of stains, fuels or potentially hazardous materials and did not identify any spills, contaminant, or leak files for the Corporation Yard site on files at the MCHD (Monterey County 2005).

# Impacts Analysis

## Methodology

### Approach

Numerous studies have been completed to establish baseline conditions for the development sites in the project area. These studies have provided a good understanding of site conditions, including site constraints and limitations, and recommendations for mitigating any identified impacts. To determine potential impacts, the proposed activity at each development site was analyzed using the information contained in the studies and the significance criteria described below.

### Criteria for Determining Significance

In accordance with CEQA, State CEQA Guidelines, Monterey County plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

#### Seismic Hazards

- Expose people or structures to potential substantial adverse effects resulting from the rupture of a known earthquake fault, seismic ground shaking, landslides, or seismic-related ground-failure, including liquefaction, and that cannot be mitigated through the use of standard engineering design techniques.

#### Landslides and Slope Stability

- Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the proposed project and potentially result in an onsite or offsite landslide or slope failure.
- Be located on an existing slope with a gradient greater than 30%.

#### Erosion

- Result in substantial soil erosion or the loss of topsoil and subsequent sedimentation into local drainage facilities and water bodies.

#### Soil Constraints

- Be located on an expansive soil, as defined by the CUBC (1997) or be subject to other soil constraints that might result in deformation of foundations or damage to structures, creating substantial risks to life or property.

#### Hazardous Materials

- Create a significant hazard to the public or the environment through the release of hazardous materials into the environment.

# Project Impacts and Mitigation Measures

## A. Seismic Hazards

**Impact GSS-A1. Placement of new structures could result in potential structural damage and associated human safety hazards resulting from ground shaking caused by earthquakes on nearby active and potentially active faults. (Less than significant with mitigation)**

Recent regional and site-specific seismic hazard assessments on the Monterey Peninsula indicate that the entire project area would likely experience strong to severe ground shaking from an earthquake during the next 50 years (Haro, Kasunich and Associates, Inc. 2001a, 2001b, 2001c, 2001d, 2001e, 2002a, 2002b, 2010a, 2010b, 2010c, 2010d, 2010e, 2010f, 2010g, 2010h, 2010i, 2010j, 2010k, 2010l; Monterey County 2002, Nielsen and Associates 2002a, 2002b, 2002c, 2002d, 2002e, 2002f, 2002g, 2002h, 2002i). Ground shaking could cause damage to project-related structures and expose people using or inhabiting these structures to adverse effects, such as injury or death. This impact is considered significant. As stated in Chapter 2, Project Description, all structures would be constructed to comply with the CUBC. Implementation of Mitigation Measure GSS-A1, which requires implementation of measures recommended in the site-specific geologic and geotechnical reports, would reduce this impact to a less-than-significant level.

**Mitigation Measure GSS-A1. Ensure final design and construction specifications include recommendations contained in site-specific geologic and geotechnical reports.**

The applicant will ensure that final design of all proposed structures includes recommendations contained in the site-specific geologic and geotechnical reports which include, but are not limited to, those measures summarized below, and any additional recommendations made by the engineer of record during the final stages of project design. (Haro, Kasunich and Associates, Inc. 2002a, 2010a, 2010b, 2010c, 2010d, 2010e, 2010f, 2010g, 2010h, 2010i, 2010j, 2010k, 2010l, 2010m)

<u>Seismic (All Development Sites)</u>

- Design all built structures in accordance with the current CUBC.

<u>Expansive Soils (All Development Sites)</u>

- Remove expansive soils and replace them with non-expansive engineered fill. A less desirable option for expansive soil mitigation would include pre-saturating the expansive soils (clays) and then underpinning foundations with helical anchors and/or post tension slabs.

<u>Shallow/Perched Groundwater (The Lodge at Pebble Beach, The Inn at Spanish Bay, Area M Spyglass Hill)</u>

- Construct subsurface drainage for excavations and permanent structures.
- For Meeting Facility Expansion at The Lodge at Pebble Beach, construct curtain drains on the north side (upslope) to protect the foundation from groundwater. Improvements at this area might affect existing subterranean retaining walls and should be evaluated by a structural engineer to determine if additional improvements or protection measures are necessary (Haro, Kasunich and Associates, Inc, 2010b).

Slope Stability (Area M Spyglass Hill)

- For New Resort Hotel (Option 1) and New Residential Lots 1-7 (Option 2) where the steepened fill slopes possess inadequate engineering qualities for structure support and are unstable, remove un-engineered fill in the quarry area down to firm in situ earth materials and replace with compacted engineered fill (inclined at 2:1 slope or flatter) in areas designated to support improvements. For residential lots, development will be on portions of the lots with less steep slopes (Haro, Kasunich and Associates, Inc. 2010c, 2010d).

Unconsolidated Fill (The Inn at Spanish Bay, Area M Spyglass Hill, Corporation Yard)

- For the Conference Center Expansion where the undocumented fill is medium dense but can be variable, design the foundation elements to penetrate undocumented fill and be imbedded into competent native soil or, alternatively, the undocumented fill could be sub-excavated to the underlying native bedrock and replaced with engineered fill to provide uniform bearing support (Haro, Kasunich and Associates, Inc. 2010a.).
- For Residential Lot Subdivision at the Corporation Yard (10 residential lots) where man-made fill underlies the area, completely remove existing landfill materials and reclaim building sites with engineered fill placed in accordance with standard engineered fill procedures to provide adequate load-bearing support and adequate surface and subsurface drainage during and after construction (Haro, Kasunich and Associates, Inc. 2010m).
- For Residential Lot Subdivision at Area K where there are some steep cutbanks, the structural foundation elements will be set back at least 20 feet from the crest of cutbanks of drainage channels.

## B. Landslides and Slope Stability

**Impact GSS-B1. Placement of buildings and grading on steep and/or unstable slopes could result in potential structural damage and associated human safety hazards from mass movements (landslides and debris flow). (Less than significant with mitigation)**

Area M Spyglass Hill has steep and/or unstable slopes on most of the development site. The steep slopes appear to be associated with a small ravine and the excavated Spyglass quarry pit. Proposed development on steep and/or unstable slopes includes most of the New Resort Hotel (Option 1) and New Residential Lots 1–7 (Option 2).

For New Residential Lots (Option 2), impacts would be reduced to a less-than-significant level through proper site design and/or dedication of conservation easements, while allowing for residential development on portions of the lots with less steep slopes.

For New Resort Hotel (Option 1), movement of the structures from their proposed location to another portion of the development area is not considered feasible without likely resulting in additional environmental impact because of the multiple environmental and physical constraints for the hotel alternative. The geotechnical/geologic feasibility assessment did not identify the existing steep slopes as a hazard that would preclude development of the resort hotel facilities in this area, although certain recommendations were made relevant to hotel construction such as control of surface and subsurface drainage, removal of unconsolidated fill and use of engineered fill (Haro, Kasunich and Associates, Inc. 2001d). A 2002 geologic investigation also recommended removal of

any unengineered fill and use of engineered compacted fill to properly support structures and development of an engineered drainage and erosion control plan (Nielsen and Associates 2002d). The geotechnical and geologic feasibility update letters (Haro, Kasunich and Associates, Inc. 2010c and 2010d) for both options corroborated those previous studies and concluded that recommendations presented by HKA in 2001 and Nielson and Associates in 2002 still apply.

There are also steep side slopes at the SR 1/SR 68 location, but these are not identified as a construction constraint in the geotechnical report (Parikh 2001).

The current LUP prohibits development on slopes exceeding 30% unless the proposed development better achieves the resource protection objectives and policies of the Del Monte Forest LUP and development standards of the CIP.

The proposed development activities would also involve a substantial amount of land grading, which could destabilize existing slopes and create unstable manufactured (cut-and-fill slopes) slopes. Resulting slope failures (e.g. landslides and debris flows) could cause damage to existing and proposed structures and expose people to resultant risk. Therefore, construction and placement of structures on steep slopes and manufacture of steep slopes in Area M Spyglass Hill is considered a potentially significant impact.

This impact would be reduced to a less-than-significant level with implementation of Mitigation Measure GSS-A1.

**Mitigation Measure GSS-A1. Ensure final design and construction specifications include recommendations contained in site-specific geologic and geotechnical reports.** See above.

## C. Erosion

**Impact GSS-C1. Grading and excavation could result in substantial soil erosion, loss of topsoil, and sedimentation. (Less than significant with mitigation)**

Construction of the proposed development would involve land clearing, land grading, and other ground-disturbing activities that could temporarily increase soil erosion rates during and shortly after project construction. The proposed project would involve grading at almost all development sites and excavation of approximately 196,000 to 247,000 cubic yards (cy) of soil.[1] Table 2-3 in Chapter 2, Project Description, identifies the cut-and-fill amounts by location. Three project elements would result in substantial excavation (> 20,000 cubic yards) at the development site:

- Pebble Beach Driving Range Relocation from Area V to Collins Field (35,600 cy).
- Area M Spyglass Hill New Resort Hotel (Option 1) (99,800 cy) or New Residential Lots (Option 2) (48,500 cy).
- Residential Lot Subdivision at the Corporation Yard (58,000 cy).

As currently planned, net project cut-and-fill balances would be 36,000 cy under Option 1 and 2,000 cy under Option 2. Fill will be supplied from cut material from the same or another project element. Cut material not used for fill would be transported to the Marina Landfill.

[1] There would be 247,000 cy under Option 1 New Resort Hotel and 196,000 cy under Option 2 New Residential Lots in the Area M Spyglass Hill development site.

The hazard of water and wind erosion at development sites in the project area ranges from moderate to very high (Cook 1978). Construction-related erosion could result in the loss of a substantial amount of nonrenewable topsoil and could adversely affect water quality in nearby surface waters. This impact is considered potentially significant. Compliance with the County's Erosion Control Ordinance (Chapters 16.08 through 16.12 of the County Code) and implementation of Mitigation Measure GSS-C1 would reduce this impact to a less-than-significant level because it ensures preparation and implementation of an erosion and sedimentation control plan.

**Mitigation Measure GSS-C1. Prepare and implement an erosion and sediment control plan.**

The applicant with a qualified consultant will prepare and implement an erosion and sediment control plan(s) for the proposed development activities. The plan will be prepared in accordance with the requirements of the County's Erosion Control Ordinance (Chapters 16.08 through 16.12 of the County Code) and be approved by the County Building Services Department. The plan will contain details and specifications for a variety of standard and site-specific BMPs that will be implemented to control wind and water erosion, stormwater runoff, sediment, and other construction-related pollutants during project construction. The plan will also include additional erosion control measures, as required by the Monterey County Erosion Control Ordinance (Section 16.12.090), such as use of mulching, construction of sediment catch basins and cessation of operations when soils are saturated and other measures as needed to control erosion.

The erosion and sediment control plan will remain in effect until all areas disturbed during construction have been permanently stabilized. Many of the erosion and sediment control BMPs that will be used during project construction are described in the BMP plan (Questa 2003). Additional measures may be prescribed during the final stages of project design and construction. The Erosion and Sediment Control Plan for each portion of the proposed project will be submitted to Monterey County Building Services Department for review and approval prior to issuance of any grading permit for that portion of the proposed project. This measure can be combined with requirements of Mitigation Measure HWQ-C1 (see Section 3.4, Hydrology and Water Quality) to prepare a SWPPP in compliance with NPDES general construction permit requirements.

## D. Soil Constraints

**Impact GSS-D1. Construction in areas of expansive soils could result in substantial damage to overlying building foundations and roadways. (Less than significant with mitigation)**

All of the proposed development sites contain at least one soil map unit that contains expansive soil at some depth. If these expansive soil materials are exposed at finished grade, they could cause substantial damage to overlying building foundations and roadways. This impact is considered potentially significant, but it would be reduced to a less-than-significant level by implementing Mitigation Measure GSS-A1.

**Mitigation Measure GSS-A1. Ensure final design and construction specifications include recommendations contained in the site-specific geologic and geotechnical reports.** See above.

**Impact GSS-D2. Construction of underground structures in the presence of shallow groundwater and weak surrounding deposits could result in inadequate drainage and structural failure during construction or operation. (Less than significant with mitigation)**

The underground parking structures at The Lodge at Pebble Beach (Parking and Circulation Reconstruction and New Colton Building) and Area M Spyglass Hill (Option 1 New Resort Hotel) would be excavated into areas with shallow groundwater. Thus excavation would likely result in significant seepage. Deep subdrains may not be able to disperse subsurface flow via gravity. The terrace deposits and buried alluvium at The Lodge at Pebble Beach and the loose dune sands that overlie the dense decomposed granodiorite at Area M Spyglass Hill are potentially unstable. Inadequate surface drainage in this area could exacerbate soil instability.

Additionally, future residential development in Area M Spyglass Hill, Area F-2, Area L, Area I-2, Area J, Area V, Area K, and Area U could include underground structures (e.g., garage, cellar) and be subject to the same impact described above.

This impact is considered potentially significant, but it would be reduced to a less-than-significant level by implementing Mitigation Measures GSS-A1, GSS-D1, HYD-A1, and HYD-A2.

**Mitigation Measure GSS-A1. Ensure final design and construction specifications include recommendations contained in site-specific geologic and geotechnical reports.** See above.

**Mitigation Measure GSS-D1. Dewater excavations and shore temporary cuts during construction of the underground facilities.**

The applicant will ensure construction specifications require dewatering and shoring as necessary to handle drainage and potential excavation wall stability during construction of underground facilities. Underground facilities include parking structures for the New Resort Hotel (Option 1) at Area M Spyglass Hill and for the Parking and Circulation Reconstruction and the New Colton Building at The Lodge at Pebble Beach. Additionally, there could be underground facilities at new residential development at Area M Spyglass Hill (Option 2).

**Mitigation Measure HYD-A1. Ensure on-site detention of stormwater run-off at development sites and oil/grease separators at parking lots; prepare final drainage plan with flow calculations and construction detail; and implement approved drainage plan.** See Section 3.7, Hydrology and Water Quality.

**Mitigation Measure HYD-A2. Maintain and monitor drainage and flood control facilities, and prepare annual reports that describe the condition, maintenance performed, and required improvements of drainage and flood control facilities.** See Section 3.7, Hydrology and Water Quality.

**Impact GSS-D3. Construction in areas of unconsolidated fill could result in settlement and substantial damage to overlying building foundations. (Less than significant with mitigation)**

Project elements that would be constructed in areas of unconsolidated fill include Conference Center Expansion at The Inn at Spanish Bay; New Resort Hotel (Option 1) and New Residential Lots (Option 2) at Area M Spyglass Hill; and Residential Lot Subdivision at the Corporation Yard. Placement of structures in these areas could result in uneven settlement that could cause substantial damage to overlying building foundations. This impact is considered potentially significant, but it would be reduced to a less-than-significant level by implementing Mitigation Measure GSS-A1 because it includes specific recommendations from the geotechnical reports for constructing these project elements.

**Mitigation Measure GSS-A1. Ensure final design and construction specifications include recommendations contained in site-specific geotechnical and geologic reports.** See above.

## E. Hazardous Materials

**Impact GSS-E1. Potential hazardous materials and methane off-gassing related to materials in the fill at the Corporation Yard could result in worker and/or resident exposure to hazardous materials or hazardous conditions. (Less than significant with mitigation)**

While the Phase 1 Environmental Site Assessment did not identify any evidence of hazardous material being dumped in the Corporation Yard area, the area is identified as an unsupervised dumping ground. Thus, there is a potential for hazardous material to have been placed in the fill, perhaps without the knowledge of operating personnel. In addition, DMCE identified a potential for methane off-gassing from the fill (Monterey County 2005). Additionally, workers and/or future residents could be exposed to hazardous materials, if present in the fill area. Methane off-gassing could also result in a hazardous condition for workers and/or future residents. This impact is considered potentially significant, but it would be reduced to a less-than-significant level by implementing Mitigation Measures GSS-E1 and GSS-E2.

**Mitigation Measure GSS-E1. Conduct Phase II investigation consisting of subsurface soil borings and initiate remedial action if warranted at Corporation Yard.**

In order to prevent potential worker and/or resident exposure to potential hazardous materials that might have been placed in the Corporation Yard fill area, the applicant will hire a qualified consultant to conduct a subsurface soil investigation, including analytical testing of subsurface soil samples from within the fill, for the presence of hazardous constituents. The sampling results will be provided to Monterey County Environmental Health Bureau and the California Department of Toxic Substances Control. If warranted based on the results, the applicant will remediate the site as necessary to prevent significant exposure of workers and/or future residents to hazardous constituents, if found. Remedial action, if warranted, will be conducted in compliance with all applicable local, state, and federal regulations regarding hazardous material and hazardous waste. Remedial action, if warranted, will be completed prior to construction of the infrastructure for the residential subdivision at the Corporation Yard.

**Mitigation Measure GSS-E2. Assess potential for methane off-gassing at the Corporation Yard fill area and incorporate methane controls and/or venting into construction plans and final design if warranted.**

In order to prevent hazardous conditions (e.g., explosion, asphyxiation), the applicant will hire a qualified consultant to assess the potential for methane off-gassing (including collection of soil gas samples) to result in unsafe conditions for workers during construction and/or future residents. The assessment will be provided to the Monterey County Environmental Health Bureau. If warranted based on the assessment, the applicant will incorporate methane control measures (such as geomembranes) and/or venting in design plans as necessary to avert hazardous conditions. Monitoring of methane will be conducted post-construction, if determined necessary by the County, to confirm the effectiveness of any implemented control measures. Design changes will be included in final engineering plans submitted to County prior to issuance of grading permit.

# Cumulative Impacts and Mitigation Measures

The impact zone for geology, seismicity, and soils is Del Monte Forest. The methodology for determining cumulative impacts is described under Analysis of Cumulative Impacts at the beginning of Chapter 3.

## A. Seismic Hazards

**Impact GSS-A1(C). Cumulative development in Del Monte Forest would include new structures that may result in exposure to seismic hazards, but the proposed project's contribution would be reduced to a less-than-significant level with mitigation.**

As discussed above, recent regional and site-specific seismic hazard assessments on the Monterey Peninsula indicate that the entire project area, which includes the proposed project and other potential cumulative development in Del Monte Forest, would be susceptible to strong to severe ground shaking from an earthquake in the next 50 years. However, implementation of Mitigation Measure GSS-A1 would ensure that the requirements contained in site-specific geologic and geotechnical reports. Similarly, other cumulative development would be required to comply with building code requirements and geologic/geotechnical report analyses as required by the County. Therefore, although cumulative development impacts related to seismic hazards are considered to be potentially significant, the proposed project's contribution would not be considerable.

## B. Landslides and Slope Stability

**Impact GSS-B1(C). Cumulative development in Del Monte Forest could expose people and structures to landslides and slope instability, but the proposed project's contribution would be reduced to a less-than-significant level with mitigation.**

Cumulative development in Del Monte Forest other than the proposed project would be very limited to construction of single-family residences. These individual homes would be required to comply with site-specific geotechnical recommendations/measures as required by the County. Potential areas where steep and/or unstable slopes exist within the project area include Area M Spyglass Hill and at the SR 1/SR 68/17-Mile Drive intersection. However, implementation of Mitigation Measure GSS-A1 would implement design criteria in these areas, and would reduce potential project impacts

from placement of building and grading on steep and/or unstable slopes. Therefore, although cumulative development impacts related to landslides/slope stability are considered to be potentially significant, the proposed project's contribution would not be considerable.

## C. Erosion

**Impact GSS-C1(C). Cumulative development in Del Monte Forest could result in substantial soil erosion, loss of topsoil, and sedimentation, but the proposed project's contribution would be reduced to a less-than-significant level with mitigation.**

Cumulative development in Del Monte Forest other than the proposed project would be limited to construction of single-family residences. These individual homes would be required to comply with site-specific geotechnical recommendations/measures as required by the County. Potential areas where there would be substantial excavation include the Pebble Beach Driving Range, Area M Spyglass Hill, and Residential Lot Subdivision at the Corporation Yard. Furthermore, potential water/wind erosion impacts at the development sites ranges from moderate to high. These conditions could lead to a substantial loss of topsoil and could adversely affect nearby water quality. Implementation of Mitigation Measure GSS-C1 would include preparation of an erosion and sediment control plan that would reduce these impacts to a less-than-significant level. Therefore, although cumulative development impacts related to erosion are considered to be potentially significant, the proposed project's contribution would not be considerable with mitigation.

## D. Soil Constraints

**Impact GSS-D1(C) and Impact GSS-D3(C). Cumulative development in Del Monte Forest, including the proposed project, may result in damage to structures or exposure of people to risks due to soil constraints, but the proposed project's contribution would be reduced to a less-than-significant level with mitigation.**

Cumulative development in Del Monte Forest other than the proposed project would be limited to construction of single-family residences. These individual homes would be required to comply with site-specific geotechnical recommendations/measures as required by the County. Potential areas of expansive soils that could result in substantial damage to overlying building foundations and roadways exist within all of the proposed development sites. Areas of unconsolidated fill include the Conference Center Expansion, New Guest Cottages at The Inn at Spanish Bay, both development options at Area M Spyglass Hill, and the Residential Lot Subdivision at the Corporation Yard. Placement of structures in these areas could result in uneven settlement causing substantial damage to overlying building foundations. However, all structures are required to be designed in accordance with the requirements of the current CUBC and implementation of Mitigation Measure GSS-A1 would ensure that structures are designed pursuant to the requirements contained in site-specific geologic and geotechnical. Therefore, although cumulative development impacts related to expansive soils/unconsolidated soils susceptible to settlement are considered to be potentially significant, the proposed project's contribution would not be considerable with mitigation.

**Impact GSS-D2(C). Cumulative development in Del Monte Forest may expose structures or people to risk from structural failure in areas of shallow groundwater and weak surrounding deposits, but the proposed project's contribution would be reduced to a less-than-significant level with mitigation.**

Cumulative development in Del Monte Forest would be limited to construction of single-family residences. These individual homes would be required to comply with site-specific geotechnical recommendations/measures as required by the County. The underground parking structures at The Lodge at Pebble Beach and Area M Spyglass Hill would be excavated into areas with shallow groundwater. Excavation could result in seepage and deep subdrains may not be able to disperse subsurface flow via gravity, and terrace deposits and buried alluvium at these locations are potentially unstable. Residential development in Area M Spyglass Hill, Area F-2, Area L, Area I-2, Area J, Area V, Area K, and Area U also could have underground structures and may be subject to the impacts from shallow groundwater and weak surrounding deposits. Implementation of Mitigation Measures GSS-A1 and GSS-D1 would ensure that recommendations contained in the site-specific geologic and geotechnical reports are implemented and that any excavation and temporary cuts would be dewatered and shored during construction of underground facilities. Therefore, although cumulative development impacts related to shallow groundwater, weak soils, and inadequate drainage are considered to be potentially significant, the proposed project's contribution would not be considerable with mitigation.

## E. Hazardous Materials

**Impact GSS-E1(C). Cumulative development in Del Monte Forest might result in potential exposure to hazardous materials, but the proposed project's contribution would be reduced to a less-than-significant level with mitigation.**

Cumulative development may result in exposure of workers and/or residents to hazardous materials or hazardous conditions. Specifically, at the project site, this includes the Corporation Yard area, identified as an unsupervised dumping ground. However, individual development projects in Del Monte Forest are not situated in proximity to the Corporation Yard and would be subject to hazardous materials/wastes investigations specific to their site. Potential hazardous conditions that would occur as a result of the proposed project would be addressed by Mitigation Measures GSS-E1 and GSS-E2, which would require preparation of a Phase II investigation, including subsurface borings and remedial action if necessary, and assess potential for methane off-gassing at the Corporation Yard, including methane controls and/or venting if warranted. Therefore, although cumulative development impacts related to exposure of workers/residents to hazardous materials would be considered potentially significant, the proposed project's contribution would not be considerable with mitigation.